**BAAL 18, 2018**
Pp. 95-112

# Archaeological Survey of the Phoenician Harbour at Tyre, Lebanon

IBRAHIM NOUREDDINE and AARON MIOR

*As early as 1930s, Antoine Poidebard's efforts were unable to confirm any physical evidence of a man-made harbour structure along the southern coast of Tyre, although his aerial photography did suggest the appearance of a submerged structure within the northern coast of Tyre. Beginning in the 1960s, Honor Frost initiated several investigations aimed at identifying and documenting the significant archaeological potential for harbour facilities within coastal Tyre. Ms. Frost later mentored the first underwater investigations lead by Noureddine and el Hélou in 2001, who discovered the existence of a man-made structure within the northern harbour area of Tyre which has been interpreted to date to the Phoenician Iron Age.*

*The main objective of the 2013 field season was to complete a topographic survey to investigate the extent and spatial context of the archaeological resources associated with the Phoenician harbour on the northern side of Tyre. Additional objectives for the 2013 field season included the assessment of the current site conditions and existing state of preservation of the underwater archaeological resources affiliated with the identified jetty structure. Based on the current understanding of the site, the northern harbour of Tyre may represent the largest man-made Iron Age harbour installation in the Levantine realm and may also represent the oldest Phoenician harbour structure identified in the Mediterranean. While additional archaeological investigations are required to realize the full importance of this site, it has the potential to provide comparative data that can be utilized to study Iron-Age harbour structures around the Mediterranean proper.*

## Historical Background

The historical place name of Tyre is derived from the Latin *Tyrus*, with the local city name of *Sour* or *Sur* originating in the Phoenician times. Additional historical monikers for Tyre include *Suru*, which emanated from the Akkadian language, and the Egyptian term *Djr*. All these place-names refer to the same geographic location along the eastern coast of the Mediterranean Sea (**Fig. 1**).

Originally, the historical settlement of Tyre encompassed the small island located between 500 and 700 metres from the continental shoreline, with the mainland settlement known as Ushu (**Fig. 2**). It was later during the siege of Tyre by Alexander in 332 BCE that a mole, or causeway, was constructed connecting the island to the mainland (Fleming, 1915). Following this period, both the mainland settlement and the former island community were known collectively as Tyre.




*Fig. 1- Map of the Mediterranean Showing Tyre located Along the Eastern Coast.*

Archaeological evidence suggests the mainland settlement extends back to the Early Bronze Age (Bikai, 1978), with textual evidence suggesting the offshore island was also occupied during this period.

The first known textual reference to Tyre comes from a curse text attributed to Asian Prince's during the 19th century BCE (Pritchard, 1969). The el-Amarna Letters illustrate the important position of Tyre during the 14th century BCE, with direct correspondence between the Egyptian Pharaoh and Abi-Milki, "Prince" of the flourishing city of Tyre (Moran, 1992).

During the Hittite Empire, the city administrators of Tyre forged a close relationship with the kingdom of Ugarit, as evidenced in the Ras Shamra tablets detailing the correspondence between the two cities. The 13th century BCE Egyptian Papyrus Anastasi I document refers to Tyre as the "city in the sea" and "Tyre the port" (Pritchard, 1969), suggesting Tyre was recognized as a significant maritime center. The Anastasi III Papyrus mentions Tyre in reference to Egyptian campaigns against the "Asiatics" and the possible role the city played supplying and aiding the Egyptian troops (Pritchard, 1969).

During the Early Iron Age, the Phoenician culture extended along the northern Levantine coast. The Phoenicians are recognized as skilled seafarers who established dominance in maritime commerce throughout the Mediterranean during this period. One commodity the Phoenicians are commonly identified with during this period was purple dye manufactured from murex shells, which was the dominant export from Tyre during the Iron Age. The Phoenicians are suggested to have held a monopoly on this resource which was one of the most expensive and sought-after products during this period. It is estimated that one gram of pure purple dye was roughly equivalent in value to twenty grams of gold (Pritchard, 1978).

According to Josephus, in the 10th century BCE, Hiram, the legendary Phoenician king of Tyre, initiated a number of infrastructure projects around the island, including the extension of the eastward side by reclaiming an area from the sea. He is also credited with enlarging the two existing ports, suggested to have been located on the northern and southern sides respectively, and creating an inland channel across the city which essentially connected the two harbour areas (Jidejian, 1996). Commercial exchanges, including the trade of cedar, wheat and virgin oil, prospered between Tyre and Jerusalem, with Hiram also







*Fig. 2- Proposed Depiction of Historic Landscape Showing the Island of Tyre Separated from the Mainland (Marriner and Morhange, 2007).*

providing the fleet for Soloman's maritime expedition to Ophir and Tarshish (Moscati, 1973).

During the 8th century BCE, the Assyrian Empire began to assert control over the northern Levantine coast. The Assyrian ruler Tiglath-Pileser III (744-727 BCE) demanded tribute from the King of Tyre, Hiram II, and influenced the maritime commercial enterprises of the Phoenicians. The Nimrud Letter XII, dated to the reign of Tiglath-Pileser III, documents the significant interest the Assyrians showed in Phoenician maritime exports, particularly in the cedar trade (Treumann-Warning, 2000). This letter also states that trade should be conducted under the authority of Ashur, the Tyrian Ruler, and prohibits trade between Tyre and settlements to the south, extending as far as Egypt (Kestemont, 1983; Frankestein, 1979; Saggs, 1955).

Maritime enterprises connected to the port of Tyre continued to flourish into the 7th century BCE. The influence and prominence of Tyre's maritime activities can be interpreted from the Assyrian "Treaty with Ba'alu of Tyre" where the Assyrian King Esarhaddon (681-669) curses; may the gods "let loose an evil wind upon your ships, tear their rigging, carry away their masts, - may a heavy sea swamp them with [its waves], may the raging floods [break] over them" (Luckenbill, 1927). This text suggests the Assyrian Empire's influence was diminishing along the Phoenician coast, with the local population benefiting from the economic stability derived from the flourishing Mediterranean coastal trade.

The strategic maritime importance of Tyre influenced Alexander's decision to lay siege to the island in 332 BCE, and it was during this period that the foundations of the modern causeway connecting the island to the mainland was constructed.

Historical and archaeological sources indicate Tyre continued to be identified as an important settlement through the Hellenistic, Roman, Byzantine and later periods (Noureddine and el-Hélou, 2005; Rey-Coquais, 1977; Le Lasseur, 1922).

Today, the city of Tyre incorporates both the former island and mainland settlement, with the causeway connecting both land masses (**Fig. 3**).




*Fig. 3- Modern Google Earth Image of Tyre Showing the Causeway Connecting the Former Island to the Mainland.*





## Summary of Previous Research

Historical documentation indicates that two harbour installations were operating within the Phoenician city of Tyre, with the northern area traditionally identified as the "Sidonian" harbour and the southern installation known as the "Egyptian" harbour.

While the potential existence and possible location of the southern harbour structure was advocated by Poidebard (1939), later investigations were unable to confirm any physical evidence indicating a man-made harbour structure in this area (Noureddine and el-Hélou, 2005). This may suggest the southern "harbour" identified in historical records constituted an offshore anchorage rather than a physical man-made harbour installation close to, or connected to, the island of Tyre (Frost, 2005).

In contrast to the southern coast of Tyre, the existence of a harbour installation on the northern side of the island was documented in the 19th century by Jules de Bertou (1843), John Kenrick (1855) and Ernest Renan (1864), who may have observed a number of courses of the structure extending above the water line. A nineteenth century drawing (ca. 1839) by David Roberts has been interpreted as depicting a portion of the ancient jetty visible above the existing water line (Roberts, 1855) (**Fig. 4**).

In the early twentieth century, Antoine Poidebard began his exploration around the area of Tyre using aerial photography. While his conclusions regarding the southern harbour may have proved inconclusive, his documentation of the appearance of a submerged jetty structure on the northern side of Tyre provided more favorable results (**Fig. 5**). Although the underwater structure identified by Poidebard could not be confirmed as man-made at the time, it did provide the impetus for further investigations into the nature of the feature and surrounding underwater landscape.

Beginning in the 1960s, Honor Frost initiated several investigations aimed at identifying the existence of harbour installations around the coast of Tyre. While her initial exploration focused on the southern side of the former island, she also identified the significant archaeological potential for harbour



*Fig. 4- Depiction of Northern Harbour at Tyre, ca. 1839, looking north (Roberts, 1855).*




*Fig. 5- Aerial Photograph of Northern Harbour at Tyre, Lebanon (Poidebard, 1939).*

facilities within the northern coast of Tyre (Frost, 1971). Later, she encouraged local Lebanese archaeologists to continue this research and provided mentorship to the first underwater investigations lead by Noureddine and el Hélou in 2001 under the direction of the DGA. The underwater investigations conducted by the DGA team confirmed the existence of a man-made structure within the northern harbour area of Tyre, in addition to confirming the high potential for the existence of significant submerged archaeological resources in the surrounding area (Noureddine and Hélou, 2005).

Frost continued to advise Noureddine and el Hélou, on scientific and historic principals during subsequent investigations within the northern harbour at Tyre. The team continued to investigate the archaeological significance of the area, with the main focus revolving around the identification of the submerged historic jetty structure. Based on subsequent research and underwater investigations in 2004 (Castellvi *et al*, 2007) and 2005 (Noureddine, 2008) this underwater structure is interpreted to represent a harbour jetty installation dating to the Phoenician Iron Age Period. This interpretation is based on a number of attributes, including comparative construction methods and materials used for Phoenician harbours identified at Tabbat al-Hammam and Atlit (Noureddine, 2010).

Prior to 2013, no underwater archaeological investigations had been conducted within the northern harbour of Tyre since 2005, with the exception of an underwater site reconnaissance in 2010 which consisted of a number of scuba dives to assess the preservation and structural integrity of the archaeological features associated with the historic jetty structure.





# 2013 Field Season

The 2013 field season at the northern harbour of Tyre occurred between 14 and 25 November 2013, and was financially supported by the Honor Frost Foundation. All fieldwork was completed under an archaeological permit issued by Directorate General of Antiquities (DGA).

## Objectives

The primary objective of the 2013 field season was to complete a topographic survey to investigate the extent and spatial context of the archaeological resources associated with the Phoenician harbour on the northern side of Tyre. Additional objectives for the 2013 field season included the assessment of the current site conditions and existing state of preservation of the underwater archaeological resources associated with the identified jetty structure.

In addition to the topographic survey and site condition assessment, a risk assessment was completed for the site. Based on previous investigations at the site, and the data obtained during the 2013 field season, proposed future excavation and site investigation methods have been developed and strategies proposed for the future management of this important maritime archaeological site.

## Field Methodology

The parameters for the 2013 field program included employing scuba divers for the topographic survey and to document current site conditions using digital photography and video which could be used in conjunction with the site risk assessment.

At the beginning of the project, a number of scuba dives were completed to assess the contextual layout and extent of archaeological resources associated with the submerged jetty structure and surrounding submerged landscape. A sketch plan of the site was created which incorporated both the underwater and terrestrial landscape features documented during the topographic survey. The shallow water depth (0-4 metres) and unique site conditions provided the opportunity to employ survey methods similar to those that would be employed on a terrestrial site.

To facilitate the topographic survey, a Leica TPS 1200+ total station was utilized with a 4.6 metre stadia rod and compatible prism. Two benchmarks were established for the 2013 field season and were strategically placed to provide visual access to the features identified to be surveyed.

The topographic survey was completed by having one archaeologist operate the total station and the other place the stadia rod on the features to the surveyed. For the underwater component of the survey, the marine archaeologist was assisted by a local fisherman. The marine archaeologist ensured the stadia rod was correctly placed on the archaeological feature being surveyed, with the field assistant on the surface to ensure the stadia rod was kept as level as possible and to facilitate communication between the archaeologists, with one being on land and the other underwater (**Figs 6 and 7**).

All survey observations were collected in a local coordinate system established for the project and were recorded as a northing, easting and elevation



*Fig. 6- Archaeologist using Leica 1200+ Total Station for topographic survey at Northern Harbour of Tyre, looking east.*



*Fig. 7- Archaeologist using Stadia Rod for Underwater Survey at Northern Harbour of Tyre, looking east.*

referenced to the benchmarks located on land. Trimble Business Center survey software was used to process and code the collected observations and AutoCAD software was utilized to create all mapping components resulting from the 2013 field season.

An Olympus digital camera with an Ikelite underwater housing was used to collect all photographic and video documentation of the site.

## Results and Recommendations

### Results of Topographic Survey

The primary objective of the topographic survey completed during the 2013 field season was to investigate the extent and spatial context of the archaeological resources associated with the Phoenician harbour on the northern side of Tyre. A number of features within the project landscape, both historic and modern, were surveyed in an effort to examine the relationship between the historic features to each other and to place them within the existing modern landscape context. The collected topographic observations were integrated into a map documenting the extent of features surveyed during the 2013 field season (**Fig. 8**).

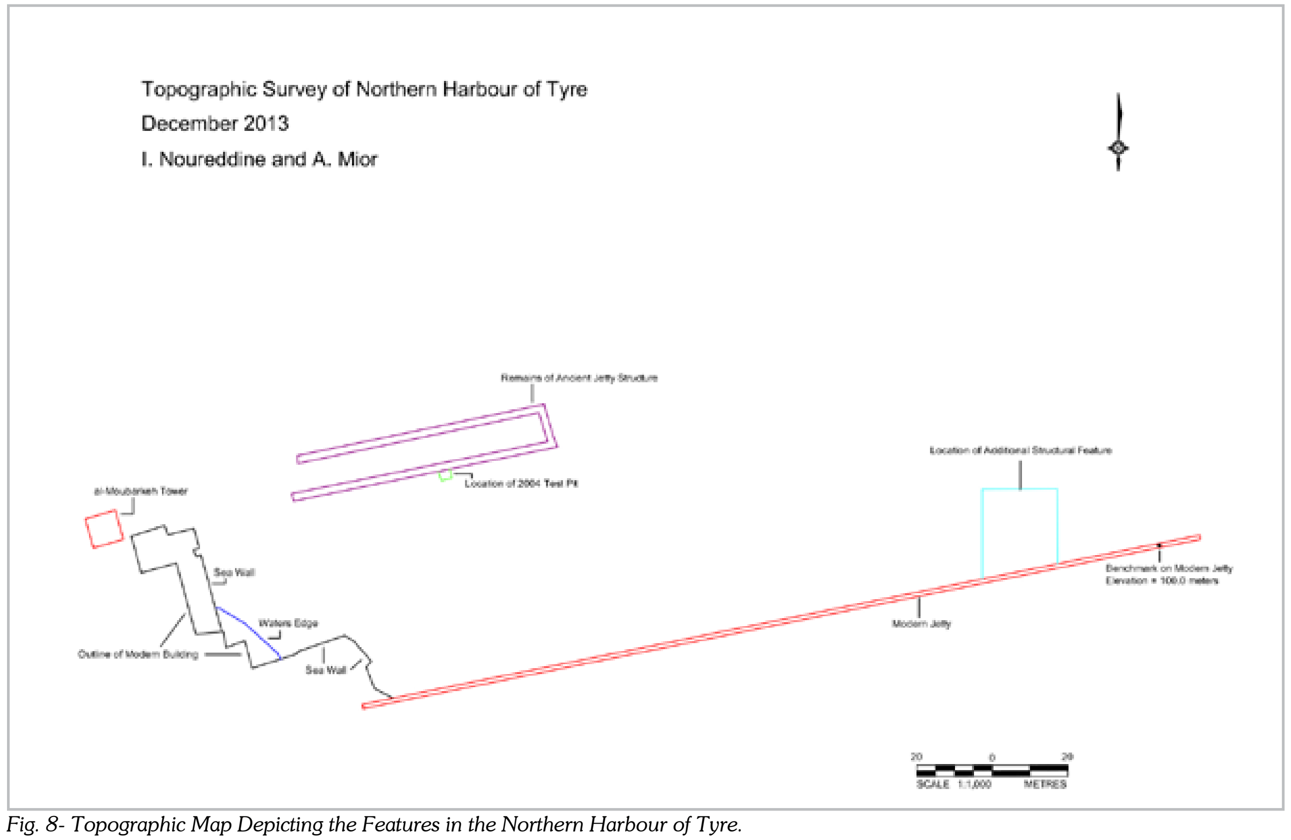



*Fig. 8- Topographic Map Depicting the Features in the Northern Harbour of Tyre.*





The topographic survey of the historic jetty walls only included the portions of the feature that were observed to be connected to the structure. Displaced blocks were found surrounding the existing structure, especially to the west towards the modern shoreline. Due to the fact they were determined to have been previously displaced, they were not included in the present survey.

The historic jetty, identified on **Fig. 8**, is oriented in an east-west direction, similar to the modern jetty, and is located approximately 57 metres north of the modern jetty structure.

Three walls related to the historic jetty structure were observed, with two walls oriented east-west, and a connecting north-south wall at the eastern end of the existing structure. Each wall consisted of one horizontal row of roughly hewn limestone blocks rectangular in shape, with each block slightly varying in size. On average, these blocks measured 1.86 metres in length, with the maximum length recorded being 2.25 metres. The average width measured 0.30 metres, with the maximum width measuring 0.45 metres. The average depth measured 0.45 metres, with the maximum depth recorded equaling 0.55 metres.

All three walls exhibited the same construction techniques with the limestone blocks laid in a "header shape", or "stones laid across" (**Fig. 9**). Only two courses of stone were visible across the majority of the feature, although in some areas a third course could be discerned protruding above the existing sediment.

The outside façade of the northern wall measured 66.8 metres in length, with the visible portion of the southern wall measuring 71.3 metres and the outside face of the eastern north-south oriented wall measuring 11.8 metres.

The surveyed portion of the southern wall extended the furthest towards the modern shoreline and measured 27.4 metres from the existing concrete structure forming part of the modern sea wall to the west.

Elevations referenced to a local benchmark established for the 2013 field season were also taken for each topographic observation. In reference to the historic jetty structure, this vertical data was used to document the difference in elevations between the inside corners along the top of the submerged jetty and sea level. The southwest corner was found 2.56



*Fig. 9- Limestone Blocks Laid in a "Header Shape" used for Construction of the Southern Wall of Jetty, looking north.*

metres below sea level, the southeast corner 3.39 metres below sea level, the northeast corner 3.35 metes below sea level and the northwest corner was observed 2.66 metres below sea level. Elevations were also established for the existing sea bed around the ancient jetty, confirming that the difference in elevations between the eastern and western portion of the structure is attributed to the sloping sea bed, with two courses of the ancient jetty exposed at each of the corners.

In addition to the topographic survey of the historic jetty structure, data referencing other features and locations were collected during the 2013 field season. **Fig. 8** shows the position of the 2004 test excavation located in relation to the historic jetty structure. One of the goals of the 2004 investigation was to excavate the sediment abutting and surrounding the southern face of the wall to expose the bottom of the existing jetty structure and determine the depth of *in situ* structural remains, although unfortunately due to time and other constraints this objective was not achieved (Castellvi *et al*, 2007). The location of the 2004 test pit was identified during the 2013 field season and was surveyed to provide spatial context related to the historic jetty structure and locate it on a map of the area for future reference.

Topographic observations along the exterior of the modern jetty structure were also surveyed to provide spatial context between the observed underwater archaeological remains and the modern landscape.

Another aspect of the 2013 field season was the observation that the modern jetty has undergone significant renovations since previous archaeological investigations at the northern harbour at Tyre had been completed. Evidence for this structural change was borne from visual and photographic evidence, as well as the dimensions calculated from the topographic survey data collected during the 2013 field season (**Fig. 10**).

the tower's position and the submerged jetty to the east, which "seems to align", was "a point worth further investigation" (Frost, 2005). Based on her observations, Frost is recognized as the first scholar to identify the possible relationship between the two historic structures.

Subsequent investigations at the northern harbour of Tyre identified the importance of Frost's observations and suggested that the tower may align



*Fig. 10- Modern Jetty Within the Northern Harbour of Tyre, looking north.*

Other structures and topographic features surveyed to establish spatial relationships between the archaeological resources and the modern landscape included two modern sea walls, one beginning just north of the modern jetty and the other positioned east of the al-Moubarkeh Tower, two modern buildings located on shore west of the historic jetty, and the al-Moubarkeh tower located on land west of the historic jetty structure (**Fig. 11**). Following the documentation of these features, they were plotted on the topographic map produced from the 2013 field survey and will provide established benchmarks and positional reference points for future archaeological investigations connected to the northern harbour of Tyre (**Fig. 8**).

Another initiative of the 2013 field season was to further investigate the spatial relationship between the submerged jetty structure and the al-Moubarkeh tower (**Fig. 12**). The potential historical relationship between these two structures was first identified by Frost who suggested, based on the exposed construction techniques, the tower may date to the Hellenistic period and that it may have "served as a lighthouse during the periods demonstrated by its fabric". Frost believed that the relationship between with the "void between the two submerged walls of the jetty" and that the al-Moubarkeh tower and the jetty may have formerly been part of the same structure. In regards to the construction date of the tower, it was suggested that the foundations may actually date it much earlier then the Hellenistic period, when it may have been refurbished (Noureddine, 2008).

An attempt was made to investigate the spatial relationship between the al-Moubarkeh tower and the submerged jetty using topographic survey data collected during the 2013 field season. When the inner walls of the ancient jetty are produced through to the tower, they are very close to matching the exterior tower walls, although the alignment does not match exactly. This may be the result of the observation that the western extent of both east-west oriented walls were difficult to discern during the survey and also there appeared to have been some previous disturbance or displacement of the structure in this location (**Fig. 13**).

Evidence for this displacement can also be suggested from the fact that the distance between the inner walls of the submerged jetty at the east end of the structure, where the limestone blocks appear to be structurally *in situ*, measures 8.05 metres, while the







*Fig. 11- Modern Buildings and Sea Walls west of Submerged Historic Jetty, looking south.*



*Fig. 13- Western end of Southern Wall of Historic Jetty, looking north.*



*Fig. 12- Al-Moubarkeh Tower located west of Submerged Jetty, looking north.*

distance between the inner walls at the west end, where there was some visual evidence of displacement of the limestone blocks, measures 7.48 metres. If the two jetty walls were initially constructed parallel to each other, the 0.57 metre difference in width between the east and west portions of the submerged jetty may represent evidence of displacement within the western portion of the exposed jetty structure.

While the 2013 topographic survey data could not confidently confirm the linear relationship between the al-Moubarkeh tower and the submerged jetty structure due to suspected displacement of the exposed limestone blocks at the west end of the submerged structure, it does provide evidence this relationship requires further investigation. It is interesting to note that the distance of the inner void at the east end of the submerged jetty structure, where the jetty appears to have remained relatively *in situ*, measured 8.05 metres, which is extremely similar to the eastern façade of the al-Moubarkeh tower, which measured 7.96 metres, a difference of only 0.09 metres.

## Results of Site Risk Assessment

The results of the site risk assessment encompassed observations and data collected during previous site visits with photographic and video evidence obtained during the 2013 field season.

During the initial underwater investigation within the northern harbour at Tyre in 2001, a round-shaped structure measuring 1.90 metres in diameter was observed at the southern end of the north-south oriented wall associated with the historic jetty structure. This feature was documented and photographed in 2001, although when the DGA archaeologists returned to the site in 2004 they observed that this circular feature had been subsequently destroyed and an iron "lever" was found nearby, suggesting it may have been used to "pry" the feature from its original location (Noureddine and el-Hélou, 2005). Unfortunately, no evidence of this important feature

remained at the site when it was visited in 2004, and although it was documented during preliminary investigations, its contextual significance could not be investigated before it was removed.

Additional evidence suggesting human interference at the site was observed in 2005 when DGA underwater archaeologists returned to the area. During initial scuba dives on the jetty site they found that a number of limestone blocks had been displaced from the upper row of the structure, and were found lying on the seabed beside the structure. Based on the physical evidence, it is believed this site disturbance is a direct result from people dislodging the limestone blocks "in search of treasure" (Noureddine, 2008).

In 2010, a site reconnaissance visit consisting of a number of scuba dives was completed within the area of the northern harbour at Tyre. It was during this site visit that a significant amount of disturbance was observed, specifically in relation to the stone walls representing the former jetty structure. Evidence of disturbance consisted of stones formerly observed *in situ* during the 2001, 2004 and 2005 field seasons were found to have been dislodged and displaced. While some of this site impact disturbance may have occurred as a result of environmental factors, iron pry bars were identified around the site, and specifically along the stone walls of the historic jetty, suggesting intentional human interference likely resulting from unauthorized looting.

The intention of the initial scuba dives of the 2013 field season were to investigate and document any evidence of disturbance to the site since the previous visit in 2010. It was observed that a number of limestone blocks appeared to have been recently displaced from the upper row of the exposed portion of the jetty structure. This interpretation was deduced from the fact that the *in situ* limestone blocks were covered with a layer of green algae which had accumulated over an extended period of time. In locations of observed disturbance, not only was the limestone block from the upper row found displaced to the sea bed, but the top of the now exposed lower row of limestone blocks was not covered with the same amount of algae as the surrounding blocks, suggesting the top of these lower coursed blocks had not been exposed for an extended period of time (**Figs 14 and 15**). While the possibility exists that environmental factors,


*Fig. 14- Evidence of Disturbance Along Upper Course of Historic Jetty, looking north.*


*Fig. 15- Additional evidence of Disturbance Along Upper Course of Historic Jetty, looking north.*

such as hydrodynamic forces from wave action, could impact and displace the upper row of limestone blocks used in the construction of the historic jetty, this would not explain why only some blocks, each weighing approximately 1 ton, have been disturbed while other adjoining blocks remain *in situ*.

Additional evidence of human activity at the site was observed during the 2013 field season. On 22 November 2013, the authors arrived on the west shore near the al-Moubarkeh tower to continue the site investigation they observed a skin diver making continuous subsurface entries over the archaeological site (**Figs 16 and 17**). The skin diver appeared to






*Fig. 16- Skin Diver and Motorized Fishing Boat at Site of Submerged Jetty, looking east.*

have a rope and possibly other implements in their possession and accessed a small fishing vessel on the surface. The actions of the skin diver were observed by the authors for an extended period of time, although for safety reasons the skin diver was not approached. Although the exact activities of the skin diver on the site could not be confidently discerned, it appeared possible they were attempting to attach a rope connected to the boat to something underwater. It may be possible that this method of using a boat for leverage may explain how some of the limestone blocks have become displaced from the submerged jetty structure.

In an effort to determine the extent of human interference to the underwater archaeological resources within the northern harbour of Tyre, the authors had a number of conversations with local residents who were willing to discuss their knowledge of people interacting around the submerged jetty structure and surrounding area. Many residents were aware of, or had actually observed, people skin diving around the site looking for valuable artifacts. This may explain some of the disturbance observed at the site during the 2013 field season.

The fact that the submerged jetty structure at the northern harbour of Tyre is located at a shallow depth (1-4 metres) and is relatively easily accessible, both from shore and by boat, make it prone to human interference. Also, that the location of this archaeological site is fairly common knowledge,


*Fig. 17- Close up of Skin Diver and Motorized Fishing Boat at Site of Submerged Jetty, looking east.*

especially to local residents, makes it vulnerable to those who are looking to profit from illegal excavations and illicit artifact removal.

The disturbance observed at the site over the past twelve years, including the displacement of the 1.90 metre circular feature observed in 2001 and removed by 2004, the observance of pry bars which may have been used to dislodge limestone blocks, discussions with local residents and the documentation of a skin diver seemingly working at the site in 2013, suggest the structural integrity of the submerged jetty structure at the northern harbour at Tyre is threatened by illegal human interference.

## Proposed Future Excavations and Site Investigations

A significant result of the high risk of disturbance to the submerged jetty at the northern harbour at Tyre is the loss of valuable archaeological knowledge and data. Therefore, site excavations are recommended to document the archaeological integrity and significance of the site, as well as additional investigations to explore the relationships to surrounding potential and known historic features within the existing landscape.

One initiative is to excavate another test pit along the exterior of the southern wall to compliment the data from previous excavations at the site conducted by ARESMAR in 2004 (Castellvi *et al*, 2007). The 2004 excavation revealed five *in situ* courses of limestone blocks used in the construction of the jetty structure, but was not successful in reaching the bottom. In an effort to establish stratigraphic correlations on the site, a new test pit, ideally located towards the eastern section of the intact jetty where structural preservation is better, would provide the opportunity to investigate a number of attributes, specifically to confirm the construction methods utilized for the structure.

This test excavation would provide the opportunity to uncover and document undisturbed portions of the jetty and facilitate the investigation into a number of features including, but not limited to, the number of preserved limestone block courses, the actual depth of the bottom of the ancient jetty, investigate the possibility in the difference in construction methods between the lower courses and the upper ones still preserved, and, assuming the jetty was constructed directly on bedrock, investigate if the foundation of the jetty was constructed on bedrock that was altered by human forces or was natural and unaltered. This test pit excavation is also expected to produce artifacts which may provide additional evidence for narrowing the date of construction and the length of time the structure was utilized.

Another excavation proposal is to investigate the possibility that structural remains of the jetty continue westward by removing the overburden sediment and observing whether *in situ* limestone blocks can be identified. This would also provide additional data to aid in the interpretation of the relationship between the al-Moubarkeh tower and the historic jetty and aid in investigating the alignment between the two structures.

Although not an expressed objective of the 2013 field season, time permitted a preliminary investigation of an additional underwater feature initially identified during the 2001 investigation within the northern harbour of Tyre. This feature, located approximately 120 metres southeast from the southeast corner of the submerged historic jetty, was found abutting the modern jetty of Tyre's northern harbour (**Fig. 8**).

When it was originally identified in 2001, this feature was only partially visible due to the significant amount of sediment in the area and appeared curved in shape. Based on the construction methods and materials visible at the time, this feature was theorized to date to the Medieval period and therefore was not suggested to have been utilized during the same time periods as the historic jetty structure to the northwest (Noureddine and El-Hélou, 2005).

The opportunity to visit this archaeological feature during the 2013 field season revealed much more detail then was observed during the 2001 season. The former interpretation of the feature being circular was originally made based on what was visible at the time, although during the 2013 season evidence was observed suggesting the feature has straight lines oriented north-south. Also, both this feature and the ancient jetty to the northwest appear to utilize similar construction materials consisting of rectangular, or header, shaped roughly hewn limestone blocks measuring an average length of 1.85 metres and an average width of 0.45 metres (**Fig. 18**).

Although both archaeological features utilized similar construction materials, the construction methods of each varied significantly. While each wall of the historic jetty was built with one horizontal row of limestone blocks in multiple vertical courses, the feature to the southeast was constructed using multiple rows of limestone blocks laid horizontally (**Fig. 19**). The difference in construction methods suggests these two features may represent different functions.

As this structure was not included in the 2013 scope of work, no topographic survey observations were collected to map the exposed portion of the structure, and unfortunately a lack of time prevented a detailed examination of the feature located southeast of the historic jetty.







*Fig. 18- Archaeologist Measuring Limestone Blocks Used in Construction of Additional Feature Southwest of Historic Jetty, looking west.*



*Fig. 19- Section of Additional Feature Located Southeast of Historic Jetty, looking east.*

Another future investigation initiative is to explore the potential relationship between the historic jetty structure and the archaeological feature to the southeast abutting the modern jetty. The observation that both features appear to utilize limestone blocks of similar size and shape suggests these stones may have been quarried and manufactured during the same period. Additional investigations may reveal whether these two structures were built during the same period, or if the feature to the southeast does date to a later period and re-used materials from the historic jetty located to the northwest. Also, if the two features were constructed during the same period, another initiative is to investigate the contextual relationship between these submerged features and determine if the feature to the southeast represents a different part of the Phoenician harbour installation or was part of a separate, distinct structure.

It is important to the researchers that future excavations utilize non-destructive methods to prevent any structural damage to *in situ* archaeological resources. The focus will primarily be to expose the archaeological structural components located within the northern harbour at Tyre and document and record these resources to investigate their spatial and temporal relationships to the historic landscape.

Exploratory, non-intrusive, geophysical remote sensing methods should be employed to survey for and identify anomalies for future investigations. During the 2001 field season, a metal probe was used to confirm the presence of features buried beneath the sediment in the area around the northern harbour of Tyre (Noureddine and el-Hélou, 2005). By using non-invasive geophysical methods, such as a magnetometer and other marine seismic survey instruments (for example sub-bottom profiler), these anomalies can be mapped and their potential identified prior to determining additional areas for archaeological investigations.

Prior to future excavations at the northern harbour at Tyre, a conservation plan should also be developed in consultation with the DGA. The intention is that any artifacts removed from their underwater context will be conserved and stored in a nearby DGA location, preferably at the Centre of Marine Archaeology located in Tyre.

## Strategy for Future Site Management

The need to combat and prevent future site destruction and initiate protection against unauthorized disturbances to the underwater archaeological resources located in the northern harbour of Tyre has been identified based on the observed disturbances to the site over the past twelve years. Therefore, the researchers propose the development and formulation of a long-term cultural resources management plan

which includes the conservation and protection of submerged archaeologically significant resources. The strategy for future site management is based on the premise that all underwater archaeologically significant structures remain *in situ*.

The most effective way to protect archaeological sites, whether on land or underwater, is to promote the concept that these places and objects have value. Not the intrinsic or economic value of treasure hunter propaganda, but cultural and historical value as precious pieces of irreplaceable history (Scott-Ireton, 2007). A public education and outreach program, including onshore documentation or signage identifying the site as a significant archaeological resource, will help educate people as to why it is important to preserve this archaeological resource and may help deter others from participating in illegal looting and disturbances to the site. Onshore documentation will also help develop the site as a potential tourist attraction, and may offer increased economic benefit to the local population.

Another potential option to protect the archaeological resources in the northern harbour at Tyre is to create an underwater cultural resources park with clearly defined boundaries. This will identify the area, and the archaeological resources contained within it, as a protected zone. Regular monitoring of the site to assess the conservation and preservation of the archaeological resources should also be a component of any future site management plan to ensure the protection of the site and the archaeological and historical integrity is maintained.

## Conclusion

Following the initial underwater archaeological assessment at the northern harbour of Tyre in 2001, a number of subsequent investigations have occurred. These efforts have revealed the archaeological significance of the site, including the identification of an historic jetty structure believed to date to the Phoenician Iron Age Period.

One of the primary objectives of the 2013 field season was the completion of a topographic survey of the historic jetty structure and the surrounding modern landscape. This survey has contributed valuable data to the investigation of the site and provided the premise for a number of initiatives which are anticipated to be fulfilled in future years.

The shallow depth of the site facilitates easy access to the submerged archaeological resources at the northern harbour of Tyre. While this can benefit the archaeological investigations within the area, it also provides convenience for those interested in participating in illicit and illegal operations aimed at profiting from these valuable historic resources.

Given the pace of destruction of the underwater archaeological resources observed in the area, there is an identified urgency to conduct additional archaeological excavations and site investigations. These investigations will aid in the interpretation of spatial and temporal relationships represented by the archaeological resources and provide additional data to document the historical maritime cultural landscape of the area.

Future site management and long-term cultural resource plans, in conjunction with a public education program, have been identified as potential mitigation strategies to aid in the preservation and conservation of the valuable archaeological resources identified in the northern harbour at Tyre.

The Phoenician harbour at Tyre may represent the largest identified man-made Iron Age Period harbour installation in the Levantine realm and may also represent the oldest Phoenician harbour structure identified in the Mediterranean. While additional archaeological investigations are required to realize the full importance of this site, it has the potential to provide comparative data that can be utilized to study contemporary Iron Age Period harbour structures around the Mediterranean proper.





## Acknowledgements

Several generous people contributed to the efforts of the 2013 field season. The authors would like to thank the Directorate General of Antiquities for granting the license to conduct archaeological investigations in the northern harbour of Tyre, for providing logistical assistance and for allowing the researchers to use scuba gear owned by the DGA. Additionally, the authors would like to extend their gratitude to the late Dr. Albert Naccach and Dr. Lucy Blue for their support and trust, and to Mohamed Amine (Abu Dany), a local fisherman who assisted with the underwater survey.

Finally, the 2013 field season would not have occurred without the generous financial support provided by the Honor Frost Foundation. Ms. Frost's interest in this project provided the catalyst to the Lebanese archaeologists who first conducted underwater investigations at the northern harbour of Tyre in 2001. She provided the mentorship, as well as scientific and historical knowledge, to the project from the very beginning and her contributions to the project will always be appreciated and forever be remembered.

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